

### **ABSTRACT OF THE DISCLOSURE**

A process for detecting electrostatic charges on a wafer surface during the fabrication of semiconductor devices after the wafer is subject to a de-ionized water rinsing step to remove particles and other impurities from a wafer surface. This process includes the steps of: (a) positioning an insulation layer above a wafer surface on which electrostatic charge densities are to be scanned; (b) using a movable probe to measure voltages at various locations at the insulating layer; (c) collecting the measured voltage distribution; and (d) examining the collected voltage distribution to identify areas on the wafer surface correspondingly to high electrostatic charge density. Because high precision and high resolution scanning can be made with this method, trouble-shooting diagnosis to be expeditiously performed with minimum interruptions to the semiconductor fabrication operation.